

Supporting legacy and veteran equipment

13th September 2022

Sulzer's parts manufacturing capability helps Eskom keep the lights on

In South Africa, the power generation sector is under intense pressure to keep up with growing demand. The country's power utility, Eskom, is continuously looking to improve the reliability of the equipment in its existing power plants, which have an average age of 40 years¹. However, as original equipment manufacturers (OEMs) discontinue their support for aging machinery, alternative solutions are required. In the case of the variable speed fluid drive couplings that transmit power to the boiler feed pumps, Sulzer's local service network has extended its support to include spare parts, ensuring this equipment continues to deliver reliable service.

Eskom has 48 variable speed fluid drive couplings aged between 25 and 30 years old within the boiler feed pump drivetrains with their continued performance ensured by Sulzer for the past 28 years.

Losing OEM support

During this time, the field service teams have developed an excellent understanding of the gearbox and its internal workings as well as maintenance requirements. This included routine interventions, such as bearing replacement, where all the parts would be free issued by the OEM. The reliability was very good with a mean time between failures (MTBF) of around six years, which coincided with the boiler feed pump maintenance schedule.

However, the OEM advised Eskom that it was discontinuing some of its support for the gearbox and would no longer provide replacement units. To ensure continued availability of the pump set and reliability of supply, Eskom needed to find an engineering partner that had the capability to produce components for the gearbox without necessitating complete upgrades.

Maintenance is very important for these vital assets, especially when considering the price of a new gearbox is approximately ZAR 32 million (CHF 2 million). Coupled with a lead-time of around 18 months, considerable planning and budgeting would be required for any project to replace these gearboxes.

Keeping the lights on

“In this case, the power station initially invested in two new gearboxes on the understanding that they would be a direct replacement, but when they were delivered, it was found that several changes were needed to the surrounding infrastructure to accommodate them,” says Willem van der Westhuizen, Corporate Specialist (Pump Technology). Realizing this was not a viable option for the remaining units, the plant asked Sulzer if the current maintenance agreement could be widened to include the supply of spare parts for the existing machinery.

David Landsberg, General Manager Services Centres at Sulzer South Africa comments: “The availability of generating capacity is essential to powering homes and industry. Eskom assessed the most effective way of maintaining the reliability of its equipment and determined that Sulzer has the best solution. Our reverse engineering and parts manufacturing capabilities mean that we can continue to deliver the levels of engineering support needed, without involving the OEM.”

Reverse engineering

Within the legacy gearboxes, there are 12 white metal bearings, two step-up double helical gear sets and the fluid drive coupling. The fluid coupling consists of a pump wheel and a turbine wheel, which are connected by means of toroidal oil flow. The amount of oil in the coupling governs the amount of power that is transmitted between the electric motor and the boiler feed pump. This power variation is constantly changing, depending on the amount of water that is required by the boiler. David continues: “The hydraulic system on these gearboxes is quite complex and it is important that we check every component, especially the oil pipework, which can crack by means of vibration caused by resonant frequencies. Regular inspections can minimize any potential issues and reduce downtime.”

The oil scoop tube and its control mechanism play a very important role as it removes oil from the fluid coupling drum of the gearbox which in turn regulates the power transfer. It needs to be maintained on a regular basis to ensure optimum performance and reliability. Sulzer has now reverse engineered this as well as several other parts, providing stock to the onsite maintenance teams.

Engineering partnership

To ensure the gears remain in good condition, they are regularly monitored by the site services team using non-destructive testing (NDT) techniques and gear meshing checks. In some cases, the gear teeth have been reground and the bearings adjusted to accommodate the alteration to the gear profiles.

These gearboxes are well-designed but as with all major pieces of rotating equipment, the plant records vibration measurements, which are taken at regular intervals. Following the recent overhaul of one of these gearboxes by Sulzer, the

vibration levels were found to be around 50% lower than the original figure, which is a significant improvement.

Sulzer's service agreement with Eskom sees most of the work being completed on site. Personnel work in partnership with the Eskom maintenance teams and are involved in all aspects of the overhaul of equipment; from parts inventories to complete rebuilds of equipment.

Laser precision reliability

Once the gearbox OEM had advised Eskom that it was no longer supporting their equipment, Sulzer was issued with a spare gearbox to allow it to be laser scanned. This enabled parts, especially moving ones such as the oil scoop tube and its control mechanisms, to be reverse engineered and stocked in the parts inventory.

Willem concludes: "Sulzer's work to support these gearboxes has been vital in helping us maintain the availability of the boiler feed pumps. Their engineering expertise has proved incredibly beneficial and will certainly support the ongoing reliability of these vital assets."

Sulzer's knowledge and expertise in gearboxes generally is transferrable to several industries, especially wind turbines. The specific understanding of the variable speed fluid coupling can also benefit operators in the mining industry, which use these high-capacity units in several applications.

Image captions:

Image 1: Maintenance is very important for these vital assets, especially when considering the price of a new gearbox is approximately ZAR 32 million (CHF 2 million).

Image 2: Sulzer's work to support these gearboxes has been vital in helping Eskom maintain the availability of the boiler feed pumps.

The image(s) distributed with this press release are for Editorial use only and are subject to copyright. The image(s) may only be used to accompany the press release mentioned here, no other use is permitted.

About Sulzer

Sulzer is a global leader in fluid engineering. We specialize in pumping, agitation, mixing, separation and purification technologies for fluids of all types. Our customers benefit from our commitment to innovation, performance and quality and from our responsive network of 180 world-class production facilities and service centers across the globe. Sulzer has been headquartered in Winterthur, Switzerland, since 1834. In 2021, our 13'800 employees delivered revenues of CHF 3.2 billion. Our shares are traded on the SIX Swiss Exchange (SIX: SUN).

For more information, visit www.sulzer.com

Press contact: Sulzer**Simon Aspinall, EMEA Marketing Manager PE & RES**

Tel: +44 (0)1132 701244 Fax:

Web: www.sulzer.com

Email: simon.aspinall@sulzer.com

Address: Sulzer Pumps (UK) Ltd. Manor Mill Lane Leeds West Yorkshire
LS11 8BR

Editorial contact:**DMA Europa****Kiki Anderson**

Tel: +44 (0) 1905 917477 Fax:

Web: www.dmaeuropa.com

Email: kiki.anderson@dmaeuropa.com

Address: Progress House, Great Western Avenue Worcester,
Worcestershire, WR5 1AQ, UK